

WHAT IS CLAIMED IS:

1. A manufacturing method of a semiconductor device, comprising:
 - bonding a first supporting substrate to a top surface of a semiconductor, a first wiring being formed on the top surface;
 - bonding a second supporting substrate to a back surface of the semiconductor wafer;
 - forming a groove to expose a portion of the first wiring by cutting the second supporting substrate, the semiconductor wafer and the first supporting substrate from a surface of the second supporting substrate, the groove reaching inside the first supporting substrate;
- 10 forming a second wiring connected to the exposed portion of the first wiring and extending over the surface of the second supporting substrate;
- forming a protection film comprising an organic resin on a surface of the second wiring by spray coating; and
- 15 forming an opening in the protection film at a predetermined position to expose the second wiring.

2. A manufacturing method of a semiconductor device comprising:
 - bonding a first supporting substrate to a top surface of a semiconductor wafer, a first wiring being formed on the top surface;
 - 20 bonding a second supporting substrate to a back surface of the semiconductor wafer;
 - forming a cushioning portion on the second supporting substrate by spray coating;
 - forming a groove to expose a portion of the first wiring by cutting the second supporting substrate, the semiconductor wafer and the first supporting substrate from a surface of the second supporting substrate, the groove reaching inside the first supporting substrate;
 - 25 forming a second wiring connected to the exposed portion of the first wiring and extending over the surface of the second supporting substrate and the cushioning portion;
 - forming a protection film comprising an organic resin on a surface of the second wiring;
 - and
 - 30 forming an opening in the protection film at a predetermined position to expose the second wiring.

3. The manufacturing method of a semiconductor device of claim 1 or 2, further comprising forming a photoresist layer on the protection film by spray coating.

4. The manufacturing method of a semiconductor device of claim 1 or 2, further comprising forming a conductive terminal on the second wiring exposed through the opening in the protection film.

5. A manufacturing method of a semiconductor device, comprising:
bonding a supporting substrate to a top surface of a semiconductor wafer, a first wiring
10 being formed on the top surface;
forming a groove to expose a portion of the first wiring by etching the semiconductor wafer from a back surface of the semiconductor wafer;
forming a second wiring connected to the exposed portion of the first wiring and extending over the back surface of the semiconductor wafer;
15 forming a protection film comprising an organic resin on a surface of the second wiring by spray coating; and
forming an opening in the protection film at a predetermined position to expose the second wiring.

20 6. A manufacturing method of a semiconductor device, comprising:
bonding a supporting substrate to a top surface of a semiconductor wafer, a first wiring
being formed on the top surface;
forming a groove to expose a portion of the first wiring by etching the semiconductor wafer from a back surface of the semiconductor wafer;
25 forming a cushioning portion on the back surface of the semiconductor wafer by spray coating;
forming a second wiring connected to the exposed portion of the first wiring and extending over the back surface of the semiconductor wafer and the cushioning portion;
forming a protection film comprising an organic resin on a surface of the second wiring;
30 and
forming an opening in the protection film at a predetermined position to expose the

second wiring.

7. The manufacturing method of a semiconductor device of claim 5 or 6, further comprising forming a photoresist layer on the protection film by spray coating.

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8. The manufacturing method of a semiconductor device of claim 5 or 6, further comprising forming a conductive terminal on the second wiring exposed through the opening in the protection film.

10 9. The manufacturing method of a semiconductor device of claim 1, 2, 5 or 6, wherein the organic resin is thermosetting.

10. The manufacturing method of a semiconductor device of claim 1, 2, 5 or 6, wherein the organic resin comprises an epoxy resin.

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11. A manufacturing method of a semiconductor device, comprising:
bonding a first supporting substrate to a top surface of a semiconductor wafer, a first
wiring being formed on the top surface;

20 dividing the semiconductor wafer into a plurality of semiconductor dice by etching the
semiconductor wafer along a dicing line from a back surface of the semiconductor wafer;

bonding a second supporting substrate to back surfaces of the plurality of semiconductor
dice through a resin layer;

25 forming a groove to expose a portion of the first wiring by cutting the second supporting
substrate, the resin layer and the first supporting substrate along the dicing line from a surface of
the second supporting substrate, the groove reaching inside the first supporting substrate;

forming a second wiring connected to the exposed portion of the first wiring and
extending over the surface of the second supporting substrate;

forming a protection film comprising an organic resin on a surface of the second wiring
by spray coating; and

30 forming an opening in the protection film at a predetermined position to expose the
second wiring.

12. A manufacturing method of a semiconductor device, comprising:
bonding a first supporting substrate to a top surface of a semiconductor wafer, a first
wiring being formed on the top surface;

5 dividing the semiconductor wafer into a plurality of semiconductor dice by etching the
semiconductor wafer along a dicing line from a back surface of the semiconductor wafer;

 bonding a second supporting substrate to back surfaces of the plurality of semiconductor
dice through a resin layer;

 forming a cushioning portion on the second supporting substrate by spray coating;

10 forming a groove to expose a portion of the first wiring by cutting the second supporting
substrate, the resin layer and the first supporting substrate along the dicing line from a surface of
the second supporting substrate, the groove reaching inside the first supporting substrate;

 forming a second wiring connected to the exposed portion of the first wiring and
extending over the surface of the second supporting substrate and the cushioning portion;

15 forming a protection film comprising an organic resin on a surface of the second wiring;
and

 forming an opening in the protection film at a predetermined position to expose the
second wiring.

20 13. The manufacturing method of a semiconductor device of claim 11 or 12, further
comprising forming a photoresist layer on the protection film by spray coating.

25 14. The manufacturing method of a semiconductor device of claim 11 or 12, further
comprising forming a conductive terminal on the second wiring exposed through the opening of
the protection film.

30 15. The manufacturing method of a semiconductor device of claim 1, 2, 5, 6, 11 or 12,
further comprising forming a photoresist layer by spray coating.

.16. A manufacturing method of a semiconductor device, comprising:
bonding a first supporting substrate to a top surface of a semiconductor wafer, a first

wiring being formed on the top surface;

 bonding a second supporting substrate to a back surface of the semiconductor wafer;

 forming a groove to expose a portion of the first wiring by cutting the second supporting substrate, the semiconductor wafer and the first supporting substrate from a surface of the second

5 supporting substrate, the groove reaching inside the first supporting substrate;

 forming a second wiring connected to the exposed portion of the first wiring and extending over the surface of the second supporting substrate;

 forming a protection film comprising an organic resin on a surface of the second wiring;

 forming an opening in the protection film at a predetermined position to expose the

10 second wiring; and

 forming a photoresist layer by spray coating.

17. A manufacturing method of a semiconductor device, comprising:

 bonding a supporting substrate to a top surface of a semiconductor wafer, a first wiring

15 being formed on the top surface;

 forming a groove to expose a portion of the first wiring by etching the semiconductor wafer from a back surface of the semiconductor wafer;

 forming a second wiring connected to the exposed portion of the first wiring and extending over the back surface of the semiconductor wafer;

20 forming a protection film comprising an organic resin on a surface of the second wiring;

 forming an opening in the protection film at a predetermined position to expose the second wiring; and

 forming a photoresist layer by spray coating.

25 18. A manufacturing method of a semiconductor device, comprising:

 bonding a first supporting substrate to a top surface of a semiconductor wafer, a first wiring being formed on the top surface;

 dividing the semiconductor wafer into a plurality of semiconductor dice by etching the semiconductor wafer along a dicing line from a back surface of the semiconductor wafer;

30 bonding a second supporting substrate to back surfaces of the plurality of semiconductor dice through a resin layer;

- forming a groove to expose a portion of the first wiring by cutting the second supporting substrate, the resin layer and the first supporting substrate along the dicing line from a surface of the second supporting substrate, the groove reaching inside the first supporting substrate;
- forming a second wiring connected to the exposed portion of the first wiring and
- 5 extending over the surface of the second supporting substrate;
- forming a protection film comprising an organic resin on a surface of the second wiring;
- forming an opening in the protection film at a predetermined position to expose the second wiring; and
- forming a photoresist layer by spray coating.